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January 12, 1952

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

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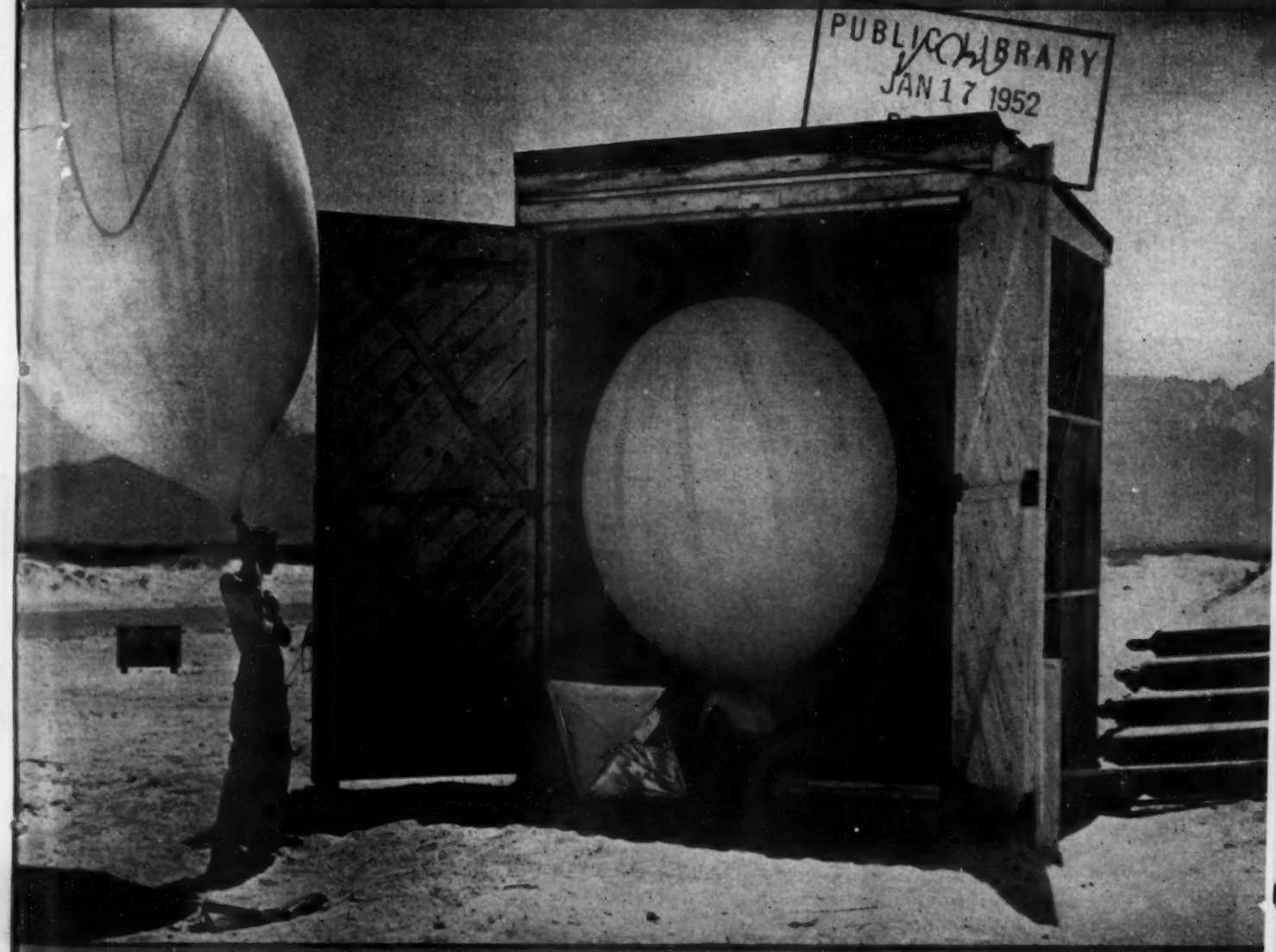

High Fliers

See Page 26

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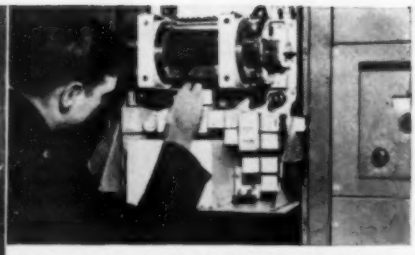
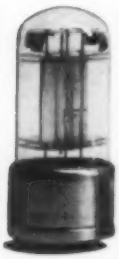


Each crystal is enclosed in a cylindrical oven which holds the crystal temperature to within 1/100 of a degree.

At the A. T. & T. building at 195 Broadway, New York, passersby set watches by the world's most accurate public clock, which is controlled by the master standard.

Front of the new frequency-time standard at Bell Telephone Laboratories. In the rear there are 600 electron tubes and 25,000 soldered connections. Room temperature is maintained within two degrees.

A vibrating crystal keeps master time



The controlling quartz crystal vibrates in vacuum at 100,000 cycles per second. The standard is powered by storage batteries, with steam turbo-generator standing by, just in case of emergency.

Ever since Galileo watched a lamp swinging in Pisa Cathedral, steady vibration has measured time. In the 1920s Bell Laboratories physicists proved that quartz crystal oscillators they developed to control electrical vibration frequency in the telephone system paced out time more accurately than ever.

Bell's latest master standard keeps an electric current vibrating at a frequency that varies only one part in a billion, keeping time to one ten-thousandth second a day.

A master oscillator governs carrier frequencies of the Bell ship-to-shore, overseas and mobile radiotelephone services, the coaxial and *Radio-Relay* systems which carry hundreds of simultaneous conversations, or television. In northeastern states, it helps keep electric clocks on time.

The new standard also provides an independent reference for time measurements made by the U. S. Naval Observatory and the National Bureau of Standards. Thus, world science benefits from a Laboratories development originally aimed at producing more and better telephone service.

BELL TELEPHONE LABORATORIES

Improving telephone service for America provides careers for creative men in scientific and technical fields.

OCEANOGRAPHY

New Ice Age Theory

Temperate climate may return to polar regions, surprising discovery of great antiquity of very deep ocean waters, measured by radioactivity, shows.

➤ A GREAT many years from now—perhaps 40,000 to 4,000,000—temperate climate may return to the polar regions. Our globe will emerge from the Ice Ages which are not now quite over.

The surprising discovery of 1,600 and 1,750 year ages for Atlantic sea water at depths of one to two miles gives rise to this speculation.

By measuring the radioactivity of the carbon isotope 14 in the carbon dioxide in deep sea water ingeniously sampled from just above the ocean bottom, Dr. J. Laurence Kulp, Columbia University geochemist, determined its unexpected antiquity. It won for him the 1951 Newcomb Cleveland $1,000 prize awarded by the American Association for the Advancement of Science at its meeting in Philadelphia.

The extreme sluggishness of the ocean circulation is proved by the new age figures. The water dredged from the ocean depths in north latitudes 53 and 58 started its submarine migration about 200 A.D. when it was at the surface of the arctic sea. Its carbon 14 exploding atoms were then manufactured by cosmic rays bombarding atmospheric nitrogen and washed by rain to earth and sea. Dr. Kulp demonstrated this by delicate measurement with a "radiocarbon calendar," a Geiger counter device that he has refined until it measures ages up to 30,000 years whereas 20,000 years was the previous limit.

The ancient water took centuries to travel toward the equator and will take even longer in its further journey southward. Dr. Kirtley F. Mather, Harvard geologist, who is president of the A.A.A.S., explained that this slow circulation is a refrigerating system for the earth, carrying polar cold to tropic regions.

But he speculated that in the stretch of geologic time this circulation could be reversed. The sun's tropic heat would evaporate the equatorial water, increase its salt content, cause it to sink even if it were hotter than the deep water. Finally the oceanic circulation would be reversed, tropic heat would be carried to the poles and warm climate would come to the arctic and the antarctic. Geologists have found fossil ferns in Greenland and evidence of ancient forests in Antartica. Eons from now such conditions may return.

To aid such earth theories, Dr. Kulp and his fellow scientists at Columbia's Lamont Geological Observatory, directed by Dr. Maurice Ewing, are enlisting the further cooperation from the Woods Hole research ship, Atlantis, and the U. S. Hydrographic Office's vessel San Pablo. Each of these in two summers got a deep sea water sample.

Large cylindrical tanks, holding 300 gallons, were sent down to 10,000 feet, sealed shut there and then hauled up. The carbon in this water was tested for age, by chemical and atomic processing. The radiocarbon dating was by the method worked out by Prof. W. F. Libby of the University of Chicago, but Dr. Kulp was able to shield the counters used with a ring of mercury that eliminated more background radioactive "noise" and this increased the measurable age span.

Possibly the new knowledge of the depths of the sea will help submarine signalling and detection of military significance, but the scientists are actually much more interested in new facts about the mysterious past of Mother Earth.

Science News Letter, January 12, 1952

MEDICINE

Combine Sulfa Drugs For Safety to Patient

➤ A WAY to lower the risk of unwanted and sometimes dangerous side effects of the miracle sulfa drugs was described to the meeting of the American Association for the Advancement of Science in Philadelphia.

Greater safety results, Drs. Alfred R. Biamonte and George H. Schneller of the American Cyanamid Company reported, when two kinds of sulfa drugs are combined in the same dose.

In this method only half of each kind of sulfa is administered to the patient. As the dangerous side effects, notably irritation or blockage of the kidney, are caused when too much of one kind of drug is given for it to be totally soluble, the danger is lessened by giving only a half dose of each.

The two scientists described safer combinations of several kinds of sulfas, including a combination of sulfadiazine, sulfamerazine and sulfamethiazine.

Science News Letter, January 12, 1952

ACHIEVEMENT PRIZE—Ernest O. Lawrence (right), professor of physics at the University of California, receives from Dr. Karl T. Compton (left), chairman of the Scientific Research Society of America, the 1951 William Procter prize for scientific achievement. Dr. E. W. Engstrom (center), who delivered the society's annual lecture, adds his congratulations. Dr. Lawrence is best known as designer of the cyclotron, and for his research into atomic physics.

ASTRONOMY

Short-Lived Explosions

➤ SHORT-LIVED ATOMIC explosions keep the well-known star Mira, first star to be recognized as a variable, in a state of constant upheaval. Sometimes they make the star burn thousands of times brighter than at other periods.

"The behavior of Mira is much more complex and less regular than was considered possible in a giant star 25 years ago," Dr. Alfred H. Joy, of Mount Wilson and Palomar Observatories of the Carnegie Institution of Washington and California Institute of Technology, told members of the American Astronomical Society, of which he is president, at the Cleveland meeting.

The star's actions are far too erratic for it to be a simple pulsating star. If such pulsations do take place, they are overshadowed by the effects of short-lived disturbances within the atmospheres of the star, Dr. Joy stated.

This enormous star, which is some 300,000,000 miles across, is in the constellation of Cetus, the whale, now visible in the southwestern part of the evening sky. At maximum it is sometimes the brightest star in that part of the sky, at minimum it is far too faint to be seen with the naked eye. It takes some 330 days more or less for the star to brighten, then return to its minimum of about the ninth magnitude.

This star, ages ago named Mira, meaning "wonderful," has been studied thoroughly by Dr. Joy for many years. About three decades ago his studies suggested it had a companion that was large enough and bright enough to be seen. Its companion, a white dwarf of the tenth magnitude, was soon spotted.

Later in the meeting Dr. Paul W. Merrill and William Buscombe, also of Mount Wilson and Palomar Observatories, reported on changes in brightness of atomic absorption lines in the star's spectrum or fanned-out light.

Science News Letter, January 12, 1952

GENETICS

"Brain Food" Benefits

➤ HEREDITY AND sex influence brains in their use of a "brain food" chemical, glutamic acid.

This discovery may settle the controversy over the effects of glutamic acid on intelligence. It is reported by Dr. Benson E. Ginsburg of the University of Chicago and Dr. Eugene Roberts of Washington University.

Some scientists have reported in the past that glutamic acid raised the intelligence of feeble-minded children and experimental animals. Other scientists reported that when they tried this acid, it had no beneficial effect.

The studies reported to the American Association for the Advancement of Science meeting in Philadelphia were made with strains of mice that had different hereditary backgrounds.

Animals in one strain go into convulsions and die in response to a loud noise. When a single injection of glutamic acid was given to these mice, the number that went into convulsions in response to noise was drastically reduced. Injections of chemicals known to check the action of glutamic acid, on the other hand, increased the number of seizures in this strain.

Mice of another strain, with inherited resistance to sound-caused fits, were not affected by chemicals that checked glutamic acid action. But in this strain, males and females reacted differently to injections of glutamic acid.

In still another strain of mice, even more susceptible to loud noise than the first strain, glutamic acid had a much less beneficial effect. And in this strain, the females responded more to the acid than the males.

Science News Letter, January 12, 1952

Question Box

ASTRONOMY

How many stars are over 6,000 times as hot as the sun? p. 25.

BIOCHEMISTRY

What chemical found in blood and saliva has now been linked to tooth troubles? p. 23.

BIOLOGY

What facts may be revealed by a study of the sex life of algae? p. 21.

GENERAL SCIENCE

What eight ways are suggested to insure a supply of scientists? p. 24.

GENETICS

What hereditary link has been found in the boy-girl ratio in human births? p. 30.

MEDICINE

How does penicillin save lockjaw victims? p. 27.

PHYSICS

How many kilowatts of electrical power were generated recently from the experimental breeder reactor in Idaho? p. 24.

PSYCHOLOGY

Would parents prefer to have boy or girl babies? p. 24.

Photographs: Cover, U. S. Air Force; p. 19, American Association for the Advancement of Science; p. 21, Mildred Ericson; p. 22, Northrop Aircraft; p. 26, National Advisory Committee for Aeronautics.

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BIOLOGY

Algae Sex Life Study May Reveal Significant Facts

➤ STUDY OF the sex life of minute green algae may reveal facts significant to human fertility or the way muscles act.

Dr. Ralph A. Lewin, of Yale, told the American Association for the Advancement of Science meeting in Philadelphia about irradiation with ultraviolet light of the cells of the algae known scientifically as *Chlamydomonas*. In some cases, the cells are paralyzed and can neither swim nor mate normally. It is the study of such cases which might reveal facts related to human beings, Dr. Lewin said.

In these one-celled organisms, cells of the two sex types, male and female, differ only in mating behavior, Dr. Lewin reported. After pairing, he said, one regularly pushes the other around.

Science News Letter, January 12, 1952

ICHTHYOLOGY

Fish as Unconcerned Over Future as Human Beings

➤ NO CONSCIENTIOUS drive to perpetuate their kind and keep the seas full of fishes inspires the migrating salmon and other such creatures. Dr. A. G. Huntsman, veteran Canadian fisheries authority and University of Toronto biologist, has come to the conclusion that the fish are no more intelligent than human beings in their concern for the future.

Men make a mistake, in his opinion, in concluding that fish think as logically as men imagine human beings conduct their lives. Fish, like people, are moved by love, hunger and other immediate objectives and men have no means of knowing any possible philosophizing by fishes that rationalize to them their actions.

Even the seemingly mysterious travels of fish up and down rivers seem to be controlled, he has found, by the distance from the river bottom at which they swim at various times of their lives.

Science News Letter, January 12, 1952

TECHNOLOGY

Army Jeeps, New Model, Are More Powerful

➤ ARMY JEEPS, new model, will have more power than the familiar type of World War II but will be more comfortable to ride and will have more compartments for carrying equipment. Details of the new jeep were revealed by Willys-Overland Motors in Toledo, the company which has been awarded a major contract with Army Ordnance.

They will be powered with Hurricane 72-horsepower engines which operate on a 7.4 to one compression ratio.

Science News Letter, January 12, 1952

SQUIRREL FEAST—An over-enthusiastic squirrel collected this cache of lodge pole pine cones. Chief naturalist Carl E. Jepson of the Grand Teton National Park in Wyoming here inspects the 10 bushels of cones this male squirrel collected during the past year to insure that it would not be hungry this winter.

AERONAUTICS

Lessen Explosion Danger

Aircraft fuel tank explosions from enemy bullet hits stopped by gas-bomb device that fights the slow-starting explosion pressure with a suppression gas.

➤ THE ELIMINATION of the danger of aircraft fuel tank explosions when hit by an enemy bullet is predicted by experts at the Royal Aircraft Establishment, Britain's aeronautical research center at Farnborough. They have developed a promising device for the purpose and it is already under test.

Such explosions are due to the fumes that rise from the gasoline in a fuel tank. When a bullet passes through them fire and explosion may occur. The new device releases a gas within the tank which stops the fumes from acquiring enough pressure to explode.

The device is an orange-size gas-bomb, filled with carbon tetrachloride, that is placed inside the tank. It is triggered with a sensitive diaphragm and releases its contents when the pressure accompanying an explosion is just starting. The gas released is scattered into the explosion and stops it before the pressure is three pounds per square inch.

Scientifically speaking, these experts say, an explosion is slow in getting started if measured in milliseconds, that is in thousandths of a second. There is a pressure rise of one-half pound per square inch in the first five milliseconds. The pressure is 100 pounds in 50 milliseconds. An explosion can be stopped after it begins, they believe, by letting off a gas-bomb inside the explosion a split-second after it begins so as to prevent this build-up in pressure.

The new principle, it is explained, does not prevent the fumes from forming or the explosion from starting. If a bullet should hit the fuel tank the explosion begins. But it is detected by a sensitive diaphragm in the first few thousandths of a second. The diaphragm operates the bomb releasing the suppressor-gas. The build-up of pressure is stopped, and also the explosion.

Tests already made indicate that this process is successful. Bullets fired through an unprotected fuel tank caused explosion. When bullets were fired at tanks with the "explosion-suppression" bombs inside them, the tanks rocked but did not explode.

Science News Letter, January 12, 1952

GENERAL SCIENCE

Fight For Mind's Freedom

Militant protest against world-wide attack on intellectual freedom launched at AAAS meeting as American Philosophical Society joins fight.

Excerpt from a paper by Dr. Kirtley F. Mather, Harvard geologist and president of the American Association for the Advancement of Science, before the forum of American Association of Scientific Workers at Philadelphia A.A.A.S. meeting.

➤ A MILITANT protest against a rising world-wide attack upon freedom of the intellect developed at the meeting of the American Association for the Advancement of Science in Philadelphia.

This is not just another drive against Communism, it is a protest against the adoption in the free western world of so many of the methods of the Soviets.

A veteran in the fight for unhampered science and knowledge, Dr. Edwin G. Conklin, Princeton biologist and president of the American Philosophical Society, is spear-pointing the mobilization of scientists to resist special loyalty oaths, hampering special regulations, and control of campus speakers.

Owen J. Roberts, retired associate justice of the U. S. Supreme Court, protests what he calls "compurgatorial" oaths that require foreswearing "sin" in the past, as well as the present, even if the definition of sin is subject to change by administrative whim without notice.

This is no new stand. In 1933 the AAAS protested the Nazis and the Fascists by declaring the commonwealth of learning can not endure half slave and half free.

This was reaffirmed in Philadelphia. The targets now are state legislatures that require special loyalty oaths of professors, as in California, universities that censor speakers on their campuses, and national laws that deny on hearsay evidence visas and passports to scientific world authorities.

Even teachers accused of advocating the overthrow of government by force and violence are entitled to an impartial hearing and should not be dismissed until the truth of the accusations is established. This is urged in resolutions adopted formally by the American Philosophical Society, the venerable academy of scientists which dates back to the days of Benjamin Franklin and Thomas Jefferson.

Abroad today in the former enemy lands of Germany and Japan, America is officially sanctioning the return of illiberal restraints on science and knowledge. Scientists view this with apprehension.

These formal protests against restraints upon intellectual freedom are expected to encourage the thousands of working scientists throughout the country to resist unwarranted inroads upon their liberties.

Text of Resolution passed by AAAS:

"The Council of the American Association for the Advancement of Science is profoundly disturbed over the present world conditions which so severely impede the free interchange of knowledge even among friendly nations. Danger to the future of our nation is implicit in such restrictions.

"The Council recognizes the need for measures which will effectively safeguard our security, but expresses its troubled concern over the manner in which such measures, in particular the McCarran Act, are being administered, to prohibit American citizens from going abroad and citizens of other nations from coming here to interchange knowledge of science which does not affect security.

"The Council strongly urges that the administrative procedures under the McCarran Act be reviewed and modified so as to minimize injustices and to increase both our internal strength and our prestige abroad.

"The Council further urges revision and improvement of the relevant portions of the Act, to retain the objectives of necessary security, but with adequate provisions to maintain free interchange of knowledge that has no security implications."

➤ SCIENTISTS, by the very nature of their mental habits, are internationalistic in their outlook, rather than chauvinistic. They are accustomed to the study of a neutral world of objective facts that are the same, regardless of what nation the observer is a citizen, or to which of the races of men he belongs.

They know that there are fellow scientists in foreign lands who are working on problems more or less akin to those of their own research projects. They recall the beneficial results of free exchange of information and ideas amongst the scientists of many nationalities in many of the most significant scientific discoveries of the past. They are more aware than anyone else of the tremendous indebtedness of American technology to the scientific research prosecuted by citizens of other countries, ever since science came of age in America.

They know that the progress of science is most rapid when there is the greatest freedom for uninhibited communication among scientists the world around, such as was provided by the many international scientific organizations, with their world-

DEFEND U. S.—These F-89 all-weather fighter-interceptors are being readied for flight at Ontario International Airport, Ontario, Calif. Operational units of Scorpions are now being formed for the Western Air Defense Force. The planes carry a radar observer in addition to the pilot.

wide distribution of publications, that were established during the latter part of the nineteenth and earlier part of the twentieth centuries.

McCarran Act Curtain

Therefore they want to reduce the keeping of scientific secrets to the absolute minimum necessary for national security in this time of international tension and strife. Therefore, also, they disapprove the red-tape curtain dropped around the United States by the McCarran Act.

Scientists, moreover, are naturally devoted to the principles of democratic freedom that shine so clearly in our constitutional Bill of Rights, based as they are upon the one most important freedom of all, the freedom to think one's own thoughts and to express them so that they may be appraised in the court of public opinion. Any semblance of thought control is resented by the true scientist, because he knows it will blight his intellectual activities or those of someone else who may be just as good a scientist as he.

As a matter of fact, in spite of human frailties that occasionally mar its fair escutcheon, the fraternity of scientists is the outstanding example of a "free-society" in modern civilization. Each scientist is not only permitted but encouraged to form and express his own independent judgment. When he thinks others are wrong, he says so. By the same token, he is ready to submit his own opinion to the judgment of his fellows. All are confident that from the clash of opinion and the dust of controversy a collective judgment will be formed which will be generally accepted by all. Lasting friendships may persist, even though all differences of opinion have not yet been resolved.

Scientist Tries to Follow Truth

It is not surprising, therefore, that scientists occasionally speak up in defense of a fellow scientist who is charged with being guilty of disloyalty because of his associations, or who is being persecuted because of allegedly "un-American" ideas he may have expressed. Even though one scientist may heartily disagree with another's opinions, he knows he must defend the right of the other to express them, else he will be false to his high calling as a sincere and earnest seeker of the truth. He trusts the laws of libel and misconduct to take care of any pernicious extension of the principle of freedom, and with Thomas Jefferson, who was a scientist as well as a statesman, he says "we are not afraid to follow truth wherever it may lead, nor tolerate error as long as reason is left free to combat it."

These attitudes of the scientists, an inevitable consequence of the intellectual discipline of science as a way of acquiring knowledge, are obviously in perfect accord with the genius of American democracy. They are, however, such as to make those who display them especially vulnerable to suspicion and recrimination in times of national fear and hysterical demands for security against dangers, without and within the nation.

It is quite unnecessary to remind you of the many attacks upon scientists in recent years, that serve as straws to show the direction in which some of the anti-scientific winds are blowing. If you don't like what a scientist says about the necessity for freedom from thought control in America, the wisdom of supporting the United Nations, the sharing of our surplus grain with hungry Indians, or anything else that he may say, the easiest way to slap him down is to insinuate that he is dangerously subversive and advocates doctrines that are approved by the Communists or their "fellow-travelers."

Anti-Scientific Machinery

The machinery for this expression of anti-scientific trends is unfortunately extensive and well-oiled. Lists of allegedly subversive organizations, membership in which is believed by many to be absolute proof of guilt, have been made public not only by the Attorney General of the United States and the Un-American Activities Committee of the House of Representatives, but also by legislative committees in several states and by numerous private organizations. Blacklists of suspected individuals are freely circulated, or sold at profitable prices, by many "patriotic" societies and "protective" associations. There seems to be a well-organized campaign to paralyze all independent thought, discussion, dissent and protest in America, and men of science are conspicuous among the targets of those who would force their fellow citizens to think only those thoughts which they themselves approve.

Against this trend the scientist should take a firm stand as a champion of intellectual freedom. He must not adopt the defeatist conclusion that the only sure way to avoid penalty for unpopular opinion is to express no opinion at all. Regardless of the odds against him, he must do his best to change the attitudes of mind of those who will yet listen to his words. Education for life in a free society must continue, and scientists have a great responsibility for its success.

Courage Is Answer to Fear

Just one specific example of the kind of education I have in mind. Few people know the facts about such lists of subversive organizations as that compiled in the Attorney General's office. Very little publicity has been given to the ruling of the U. S. Supreme Court, a few months ago, which, as former Attorney General Francis Biddle points out in his recent book, "The Fear of Freedom," knocked out the whole system of listing. The Court ruled that it was a denial of due process to thus brand organizations without a hearing. We cannot hope to compensate for all the harm already done by the unjustifiable use to which these lists have been put, but we can at least hope to reduce their harm in the future by spreading such information about them as widely as possible.

The future is by no means hopeless for science and scientists in America, in spite of the contemporary trends of thought that are antagonistic to them. There is much reason for fearing the adverse elements in the mental climate that surrounds us, but as Robert Oppenheimer has well said, "The answer to fear cannot always lie in dissipating its causes or in yielding to it. Sometimes it lies, simply enough, in courage."

Science News Letter, January 12, 1952

INVENTION

Electric Table Lamp Is Energized by Radio Waves

➤ AN ELECTRIC table lamp, which has no wire or other visible connection to a source of electric energy, has been issued a patent. It is energized by radio-frequency waves from a transmitter in a secluded place in the room. Patent 2,579,989 was awarded to Nathaniel B. Wales, Jr., of New York City, on this invention.

Science News Letter, January 12, 1952

BIOCHEMISTRY

Fatty Chemical Linked To Tooth Troubles

➤ CHOLESTEROL, a fatty chemical involved in arthritis and artery hardening, now is linked with tooth troubles.

Tests of saliva from people with various disorders of the teeth as well as of the body show this. The tests were reported by Dr. Frances Krasnow of the Guggenheim Dental Clinic, New York, to the American Association for the Advancement of Science meeting in Philadelphia.

Persons who are "medically as well as dentally normal" have an average saliva cholesterol reading of seven. Those without tooth disorders but suffering from some disease such as artery hardening or arthritis have a saliva cholesterol reading of nine. Those with dental disorder only rate 11 and those with both tooth and body diseases rate 13. The figures are for milligrams of cholesterol per 100 milliliters of saliva.

When the teeth and the rest of the body are restored to their best state of functioning, the saliva cholesterol reverts to normal, Dr. Krasnow reported.

The new findings on cholesterol in saliva may lead to better understanding of the part this chemical plays in health and disease. In addition, saliva tests for cholesterol may give doctors and dentists a new diagnostic tool easier to use than blood tests.

Science News Letter, January 12, 1952

MEDICINE

Doctor Urges Care in Use Of Isotopes as Medicine

➤ RADIOACTIVE ISOTOPES, by-products of the atomic reactors producing materials for the A-bombs, when used in treatment of cancer and for other purposes, impose a great responsibility on physicians.

Few conventional medicines, said Dr. Albert H. Holland, Jr., medical director of the Armour Laboratories, Chicago, have the power to produce drastic changes in the body several years after they are administered. This is the case with the radioactive materials given to cancer patients to kill the malignant cells of tumors.

Dr. Holland spoke before the American Association for the Advancement of Science meeting in Philadelphia.

"There is much that remains to be learned concerning the ultimate biologic effects of radiation," Dr. Holland pointed out. "Not only do we not understand the complex biochemical changes occurring during the acute phase of radiation damage, but we also have a very limited fund of knowledge concerning genetic effects of total body radiation."

It is important, said Dr. Holland, that an accurate diagnosis be made. Doctors just cannot try out radioisotopes to see if they will do any good the way other less drastic medicines are sometimes used. Further, the patient should almost always be told that radiation is to be used.

The physician must know and understand radioisotopes as diagnostic and therapeutic tools of proven value, he urged. There are some 500 radioactive isotopes representing more than 92 elements, many of which are now available commercially from the Atomic Energy Commission. Each has its own characteristics, which the physician must know and understand.

Science News Letter, January 12, 1952

PHYSICS

Power Generated From Atomic Breeder Heat

➤ SMALL AMOUNTS of electric power have been produced from heat energy releasd in the operation of the experimental breeder reactor, recently completed at the National Reactor Testing Station in Idaho.

In a trial run on Dec. 21 and 22, electrical power of more than 100 kilowatts was generated and used to operate the pumps and other reactor equipment and to provide light and electrical facilities for the building that houses it.

The heat energy generated was removed from the reactor by a liquid metal at a temperature high enough to generate steam to drive the turbine.

This new reactor was designed and is being operated by the Argonne National Laboratory, Lemont, Ill.—the reactor research center run for the AEC by the University of Chicago. The tests were supervised by Laboratory Director Walter H. Zinn and H. V. Lichtenberger, the Laboratory project engineer for the experimental breeder reactor.

The principal function of the breeder reactor is the long range goal of converting nonfissionable material into fissionable material more rapidly than nuclear fuel is consumed.

Power generation is being carried out to get data on handling liquid metals.

Science News Letter, January 12, 1952

GENERAL SCIENCE

Eight Ways to Insure Supply of Scientists

➤ WE HAVE enough scientists and engineers for either war or peace, provided we follow an eight-point program to use them in the most efficient way possible and to keep new ones coming.

On the other hand, the Russians greatly encourage the growth of the number of scientists and engineers by making them a sort of controlled "elite" of the Soviet Union.

Thus the two policies of East and West concerning what some consider to be the most precious resource of any nation in a life-and-death-struggle — scientific brains — were described at the meeting of the American Association for the Advancement of Science in Philadelphia.

"Our resources of scientists and engineers," said J. F. Hilliard, director of the Defense Manpower Administration, "are potentially capable of meeting the requirements of peaceful developments, or of war, if that should be thrust upon us."

However, he said, we must do eight things to realize that potential. These are: to determine how much and what kind of research is necessary, for employers to make the maximum conservation and use of scientists and engineers, to plan more efficiently the use of individuals and research teams, to divide the available scientists and engineers more efficiently between armed forces and civilian employers, to give them better pay and working conditions, to use the scientists and engineers of allied nations, to encourage men and women of exceptional scientific talents, and to insure a continuous flow of potential scientists to the colleges.

Soviet methods are in contrast to this proposed program for Americans. New scientists and engineers are attracted by larger pay, greater privileges and prestige, according to David Rodnick of the Economic Cooperative Administration. However, all students are carefully indoctrinated in Communist philosophy and the research they carry out must be of interest to some department of the government. Engineering sciences are considered safe in Russia, as long as the engineers increase production and remain politically reliable.

Science News Letter, January 12, 1952

IN SCIENC

MEDICINE

Radioactive Gold Double Benefit to Cancer Victims

➤ CANCER PATIENTS get double benefits from radioactive gold. It slows down the growth of the cancer cells themselves. It also slows down the secretory activity of normal cells lining body cavities.

When cancer has spread from its original location to some body cavity, excess fluid is produced by normal lining cells of the cavity, Dr. Shields Warren of the Atomic Energy Commission explained to the American Association for the Advancemnt of Science meeting in Philadelphia. This may be a very troublesome symptom. Radioactive gold relieves it.

The radioactive gold is used as a colloid and either injected into the cancer mass or into one of the body cavities.

Radioactive gold, radioactive cobalt, radioactve phosphorus and radioactive iodine and the four radioactive isotopes show most promise as medicines, Dr. Warren indicated. As a whole, he said, the radioactive isotopes have "proved disappointing" in cancer treatment, though they are useful for diagnosis and for giving new information about processes in the body including cancer.

Science News Letter, January 12, 1952

PSYCHOLOGY

Parents Satisfied to Have Boy or Girl Babies

➤ THE IDEA that American parents prefer a son to a daughter is probably a myth. The most common type of sex preference among both mothers and fathers is for one child of each sex, a survey conducted by Drs. Jeanne E. Clare and Clyde V. Kiser, of the Milbank Memorial Fund, indicates.

Most couples are satisfied with the sex of the children they have, whether they are sons or daughters. Those who have one child state the sex of that child as the sex they prefer.

About a third of the 693 couples who had children of only one sex, however, indicated that they had planned the birth of the last child because they wanted a child of the other sex. Thus parents of a large family of all boys or all girls may keep on having babies in the hope of having one of the other sex.

And of the 591 couples who already had at least one son and one daughter, nearly half of both husbands and wives gave this as a reason for not adding further to the size of their families.

Science News Letter, January 12, 1952

NCE FIELDS

ASTRONOMY

Minor Planets Have Violent Collisions Very Infrequently

➤ SEVERAL MILLION tons of matter are pulverized into dust each year by collisions between minor planets, Dr. Stefan L. Piotrowski of the University of Krakow, Poland, reported to the American Astronomical Society meeting in Cleveland.

The average minor planet, making its way between the paths of the big planets Mars and Jupiter, can be expected to bump head-on into another asteroid and crush into dust both itself and the other about once in a billion years, Dr. Piotrowski calculates. But if the planet has a greatly elongated orbit or if its path crosses that of most of the other asteroids, its chances of a catastrophic collision are tripled.

The time that is likely to elapse between two minor collisions, when one asteroid hits another off-center or just grazes it, is measured in hundreds of millions of years, Dr. Piotrowski reported.

The average speed at which one asteroid will bump into another is estimated to be rather low, only three miles per second.

Cosmic debris from collisions of this type is believed to produce the dust that slowly spirals into the sun to form what we see as the zodiacal light. This faint wedge-shaped band of light, visible on both sides of the sun, is most easily seen in northern latitudes on spring evenings after sunset and autumn mornings just before sunrise.

Science News Letter, January 12, 1952

BIOCHEMISTRY

Cholesterol Protects Arteries from Damage

➤ DISCOVERY THAT cholesterol protects arteries from damage was announced by Dr. Russell L. Holman of Louisiana State University School of Medicine at the meeting in Philadelphia of the American Association for the Advancement of Science.

Cholesterol is the fat-like substance which for the past several years has been blamed for damaging artery walls. Many patients have been put on diets low or lacking in cholesterol in the hope of stopping such damage and thus preventing development of high blood pressure and heart trouble.

Dr. Holman's findings were made on dogs which ate a high fat diet for eight weeks or longer. Following this, the animals' kidneys were made to function below normal. The dogs developed artery damage closely resembling two artery diseases in humans, rheumatic arteritis and periarteritis nodosa.

"Too much" of something in the diet and "too little" of something from the kidney are what cause the artery trouble, in Dr. Holman's opinion.

He believes that the primary injury to the artery walls is produced by peroxidation of certain unsaturated fatty acids. Normally, he says, this is prevented by fat soluble anti-oxidants acting with one or more substances secreted by the kidneys.

Adding cholesterol to the diet gave the "unanticipated" result of preventing the artery damage induced by the high fat diet and kidney insufficiency.

This points, Dr. Holman said, "to a primarily protective influence of cholesterol, possibly detoxification of toxic fat acids by esterification."

The artery damage produced in the dogs was dissociated from the effects of age, sex, hypersensitivity, high blood pressure, too much cholesterol in the blood and infection.

Science News Letter, January 12, 1952

ASTRONOMY

Over a Hundred Stars Are 6,000 Times as Hot as Sun

➤ OVER A hundred stars each at least 6,000 times as hot as our sun have recently been spotted in the Northern Cross region.

The majority of these tremendously hot and extremely blue stars in the constellation of Cygnus the swan are quite faint. At first it was thought they might be much farther away than the 135 or so such stars already known, Dr. J. J. Nassau of Warner and Swasey Observatory of Case Institute of Technology and Daniel L. Harris III of Yerkes Observatory of the University of Chicago reported to members of the American Astronomical Society meeting in Cleveland. Now they are thought to be about the same distance as the bright ones.

The brightness and color of these stars indicate that the light from these stars is dimmed and its color reddened as it travels through a dense cloud of interstellar dust, Dr. Nassau stated. These stars are probably so far away that their light which we see started toward the earth 5,000 years ago.

One of these stars would have been 300 times brighter had its light not passed through the dust cloud. For a star of its temperature, the light is redder than that of any other star known, the astronomers reported.

Some 4,600 additional red giant stars at least a hundred times as bright as our sun were reported by Dr. Nassau and Victor Blanco of the Warner and Swasey Observatory, and Dr. W. W. Morgan of Yerkes Observatory. These stars are relatively cool, their surface temperature being half that of our sun.

Some 360 still rarer stars known as carbon stars were detected by these astronomers. Their atmospheres contain cynogen, a compound of carbon and nitrogen.

Science News Letter, January 12, 1952

METEOROLOGY

Water Vital for New Power May Freeze

➤ A RETURN of the acute power shortage in the Pacific Northwest was seen if the Weather Bureau's forecast for the period ending Jan. 30 is borne out.

The forecast calls for temperatures averaging below seasonal normals west of the Continental Divide and in the northern plains, with greatest departures from normal in the Pacific Northwest. Temperatures averaging below freezing are expected in the mountains surrounding the Columbia river basin. The waters that fell during the last few weeks may well freeze, and thus be unavailable for power production.

Aluminum plants vital to the defense effort depend on this power.

In the South and Southeast warmer than usual weather for January is indicated with prevailing mild weather along the Gulf coast and in the southeastern states. Elsewhere in the nation, temperatures will be about normal for January.

There will be more snow and rain than usual during January in most places, the Weather Bureau says. From the central plains northeastward, much of this precipitation will be in the form of sleet and freezing rain. The Pacific Northwest and the southern states from Texas eastward, however, will not receive as much snow or rain as usual during January.

Science News Letter, January 12, 1952

PSYCHOLOGY

Radio's Child Wonders Outstanding as Adults

➤ CHILD RADIO geniuses do not fizzle out when they grow up. They are as outstanding as adults as they were as children.

Prof. Paul Witty of Northwestern University told the American Association for the Advancement of Science meeting in Philadelphia about his follow-up of boys and girls who appeared three or more times on radio and TV child quiz programs.

The 10 girls and four boys already in full-time occupations average $5,000 a year. One makes $20,000. Those with higher salaries include an actress, concert musician, organic chemist and reporter and rewrite man. One boy got his Ph.D. at 22 and is doing research in Copenhagen.

The young geniuses are all healthy and they enjoy life. They read a wide selection of novels, they play chess, go to concerts and the theater, play music, dance, golf, swim, ride, hike and travel.

They feel that schools did not help them much in achieving success.

Many said their teachers had been burdened with large classes and did not stimulate their gifted pupils. They saw both advantages and disadvantages in putting gifted pupils in special classes, but on the whole thought it would be a good thing.

Science News Letter, January 12, 1952

METEOROLOGY

Flying High for Weather

Meteorologists seek data from ever higher altitudes and ever more distant places to give us more accurate predictions and longer range forecasts.

By WADSWORTH LIKELY

See Front Cover

▶ TO TELL us what tomorrow's and next month's weather will be, the weatherman is reaching ever higher into the sky and ever farther north into the Arctic and south to the tropics.

Some day, he may have to reach the sun for accurate weather forecasts. Before that he will have to look to the southern hemisphere and even the Antarctic.

Already the meteorologists are sending balloons 100,000 feet up into the thin air to find out the temperatures up there, the wind directions, the humidity and the atmospheric pressures. And information garnered from rocket flights 100 miles up may some day be integrated into the mass of information which is sifted before your daily weather forecast and the predictions for the month ahead are prepared.

The weather in your home town tomorrow will be the product of forces so vast and complicated, forces reaching so far out into space and so far around the face of the globe that it is amazing the Weather Bureau can predict it correctly more than 50% of the time. Yet, in some places, their forecasts hit it on the nose as high as 95% of the time.

If it rains tomorrow, that rain came from the waters of the Pacific or the Gulf Coast—only a thin strip along the Atlantic receives much Atlantic water on its umbrellas. It first had to be drawn up into the sky, in the form of gas-like water vapor by the heat of the sun. And then the tons of water had to be propelled through the air thousands of miles by the force of wind currents girdling the globe from 10,000 to 40,000 feet up, and perhaps higher.

Nuclei Particles Needed

Yet it would not rain, if enough salt or dust particles were not in the air so the water vapor could go through the steps of forming extremely tiny ice crystals and growing large enough to fall by their own weight out of the sky until they fall far enough down to melt into rain drops.

And the rain would only be a few drops unless the heat released when the ice crystals formed did not draw more water vapor into the cloud to provide more ice crystals to melt into more rain drops.

The weatherman must take water and salt from the Pacific or the Gulf, winds propelled by the cold of the Arctic and the heat of the tropics, dust swirling up from the deserts, he must take all these and a lot more and come up with a prediction of whether it will rain in your home town tomorrow.

He is not satisfied that he has enough information. That is why he is reaching out in all directions for more. Where he cannot yet secure more information, he is learning how best to use what he has.

How does the meteorologist get information from high in the sky? First, merely by looking. He looks at those very high clouds called noctilucent which travel from 200,000 to 300,000 feet up. There is still controversy over what these clouds are made of—it might be water droplets, or maybe dust carried high into the atmosphere. The weatherman observes the directions in which they travel and tries to estimate how fast they are going.

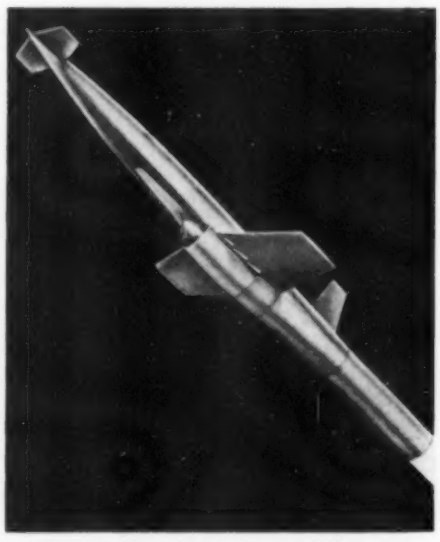
Meteor trails—from 150,000 to 500,000 feet—provide more hints about the movement of the upper atmosphere. They are affected by the wind currents just as are the smoke letters of sky writing.

Then he looks at the air glow and the aurora borealis to get some idea of temperature distributions. Some auroras can be observed for this purpose as high as 1,300,000 feet or 250 miles.

For further visual observations, he shoots things up into the sky—gun shells and, lately, rockets. The path of gun shells can give some indication of winds up to 100,000 feet. Smoke bombs set off in rockets and the vapor trails have given information on winds up to 260,000 feet or about 50 miles.

Observations of another kind are made with both sound and radar waves beamed into the air. They bounce and their echoes come back from the various barriers the components of the atmosphere set up. Indications of both temperature and wind direction can be secured in this way, as well as the composition of the atmosphere.

But the best method, of course, is to send the instruments up there to measure the temperature, wind speed, atmospheric pressure and relative humidity. This is usually done with balloons, but lately some of the rockets, fired higher into the sky than any other man-made thing has gone, have been carrying meteorological instruments more than 100 miles.



FUTURE MISSILE?—Guided missiles based on such research models may some day aid in getting upper-air weather data.

Long-Range Forecasts

Today's regular extended forecasts—for periods of up to 30 days—are dependent upon worldwide observations of conditions in the atmosphere from 10,000 to 40,000 feet up. Balloons equipped with instruments and radio transmitters automatically send back to the earthbound weatherman the data he needs to construct his charts of the upper skies. In Germany, meteorologists regularly use observations from even higher levels—55,000 feet.

Now balloons go up to 100,000 feet, but not enough of them to provide meteorologists with a complete picture of conditions that high. Without the complete picture of the movement of the winds and the temperatures over half the world, the information cannot be regularly used.

Even if weathermen had a good picture of the sky that far up they would not be able to use it right away. There is still a lot more to learn about atmospheric conditions closer to earth. But they are reaching upward all the time.

Two scientists, William W. Kellogg and Gerhard F. Schilling of the University of California at Los Angeles, have pieced together, from the fragmentary information available, a picture of what they think the prevailing circulation is up to 75 and 80 miles high.

Their picture shows that the entire circulation in these rarefied reaches of the sky reverses itself every six months, as winter becomes summer and vice versa. They find that from about 15 to 40 miles up, the air is moving upward over the summer pole and downward over the winter pole. If this is true it is bound to have an effect on the circulation of the air we feel on our faces here below.

They also find that the temperature varies—at some altitudes it is extremely hot and at others extremely cold.

Their calculations depend not alone on the observations they have been able to collect. Chemical and physical reactions can occur in the stuff that makes up the atmosphere. How this atmosphere is changed by the sun and the movement of the earth affects the weather.

Because this is so important, weathermen would like to see high flying balloons carry other instruments into the sky. There are natural radioactive tracer materials way up there—a Geiger counter could indicate their presence.

Sun's Effects Studied

And meteorologists are lifting their eyes even higher. They are studying the sun. The amount of heat we receive from the sun, whether our oceans or our land receive it, its effect on the components of the atmosphere, how much of it does not get through our atmosphere to us, how it affects the circulation of the air—all these are important to our knowledge of the weather.

What goes on within the sun itself is getting attention. Many scientists have suggested connections between sunspots and our weather.

In addition to moving upward, weathermen are moving north and south. The north has received more attention than the tropics, but it is the belief of Jerome Namias, chief of the Extended Forecast Section of the Weather Bureau, that more information, particularly about what goes on in the air 10,000 to 40,000 feet above the equator, is necessary to good long-range forecasting.

In the Arctic, the Air Force flies every other day to the North Pole and back to Alaska checking weather conditions. The Weather Bureau, in cooperation with Canada and our Air Force, has stations in the Arctic which send data to Washington.

The air, at least up to 40,000 feet, moves in a great circle around the northern hemisphere from west to east. As the atmosphere in the tropics heats up and that in the Arctic grows colder, pressure is put on this current which bends it in north-south wave patterns. This causes changes in our weather, allowing heat to come north and cold to spill out of the Arctic. If that did not happen, the tropics would grow hotter and the north pole colder and colder.

This method of nature to keep the weather in balance is the reason why observations of the weather both to the north and the south of us as well as high above us are important.

As the weathermen reach farther out for information, they continue to gain new knowledge of how our weather is formed. More accurate predictions thus made possible for ever longer periods of time into the future will affect almost everything we do.

Science News Letter, January 12, 1952

ANTHROPOLOGY

Asiatics Found America?

➤ VOYAGERS FROM Indonesia and Indochina may have "discovered" America by crossing the Pacific 700 years before Columbus and some 300 years before the Vikings.

This is the opinion of Dr. Gordon Ekholm, associate curator of anthropolgy of the American Museum of Natural History in New York. He bases his opinion on the existence of marks of the culture of southeast Asia in Mexico and Central America dating from about 700 A.D.

Columns and balustrades with a serpent motif, found at Chichen Itza in Mexico, he says, are almost identical with columns and balustrades found in Java. Types of thrones and the manner in which artists handled the lotus motif are similar too, he pointed out.

Dr. Ekholm is not sure how the southeast Asians got to what the archaeologists call "Middle America." He points out that voyages were made from India to Indonesia and Indochina in ships which could carry 200 people and stay out of sight of land for 60 days as far back as 400 A.D.

His findings, he says, indicate a "complex of traits" which have no antecedents in Middle America, but which are similar to traits found in southeast Asia. Dr. Ekholm believes that there must have been various contacts over a period of years after 700 A.D. The motifs, he thinks, have a sort of Buddhist or Hindu character about them.

Science News Letter, January 12, 1952

MEDICINE

Penicillin Saves Lockjaw Victims

➤ PENICILLIN CAN help save lives threatened by tetanus, or lockjaw, the deadly infection which can get into war wounds as well as those made by stepping on a nail.

The famous mold remedy can wipe out the tetanus infection in most cases within 24 hours after injections of it have been started, four Puerto Rican scientists report in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Dec. 22). The four are Drs. R. S. Diaz-Rivera, Emilio Ramirez, Eduardo R. Pons, Jr., and Mercedes V. Torregrosa, all of San Juan.

Antitoxin is needed to neutralize the toxin, or poison, produced by the tetanus germs, they point out. But penicillin helps save patients by stopping growth of more germs, thus preventing more toxin getting into the patient's body. Wound cleansing and sedatives were also used.

Science News Letter, January 12, 1952

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AERONAUTICS

Giant Plane, Eight-Jet Bomber, Nears Completion

➤ WHILE NO details are being released by the U. S. Air Force relative to its new heavy bomber, the XB-52, powered with eight jet engines, except an unrevealing photograph, it is a product of the Boeing Aircraft Company and appears to be a companion ship of the Boeing B-47, a six-jet-engined bomber which made its first flight late in 1947.

It was this B-47 that in 1948 made a dash of nearly 2,300 miles from Moses Lake Air Force Base in the state of Washington to Andrews Field near Washington, D. C. in less than four hours at an average speed of 607.8 miles per hour.

The new XB-52, like the B-47, has its jet engines suspended under the wings. Twin engines are used, the two in each pair being side by side. They are so placed that they divide the wing into three nearly equal sections.

The XB-52 resembles in many respects the Boeing B-50 series of bombers. These, however, are powered with four conventional engines driving propellers and the engines are mounted above the wings. They are about 99 feet in length and have a wingspan of 141 feet. Their normal loaded combat weight is 140,000 pounds and they have a maximum speed of 400 miles an hour. The XB-52 is expected to be in the 600-miles-per-hour class.

GEM Testing

By B. W. ANDERSON

Director of the Precious Stone Laboratory, London Chamber of Commerce

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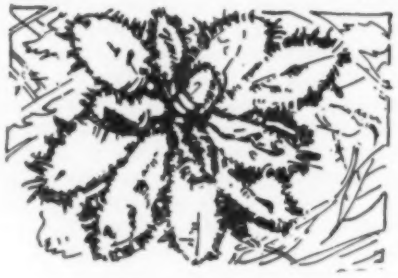
BOTANY

NATURE RAMBLINGS



Winter Rosettes

➤ PLANTS HAVE a double problem to face in regions, misnamed "temperate," where there is an alternation between a tropic summer and an arctic winter.

During the growing season their task is to become as tall as possible, reaching upward toward the sun for the vital rays indispensable to food-making. During the winter their job is to keep away from exposure to sleet and frost and from the arid cold winds and too sudden thaws.

The winter task is by far the more difficult, and annual plants sidestep it altogether by dying and entrusting the future of their several species to weatherproof seeds. Tougher woody plants either shed their leaves or reduce them to mere needles, and store next year's vegetative parts inside buds protected with a jacket of varnished scales. Perennial herbs simply hide underground.

A fourth solution of the winter problem is presented by the so-called winter rosette plants, such as the dandelion, mullein and wild lettuce. These plants are usually biennials, starting from seed during the summer, wintering over as flat circles of leaves on the ground. In spring they enjoy a considerable start over their annual neighbors, which have to begin from seeds, and over the perennials, which have to come up from beneath the ground.

In spite of frosts and snows, persistently green even after hard freezes, at most making a slight concession to the cold by taking on a purplish tinge, the little round mats of leaves may be seen everywhere although taller plants have long since withered and died.

The formation of these little leaf-circles is a favorite trick of biennial plants, for their life is not an easy one. A biennial must make at least a large part of its vegetative growth after germinating in late spring or early summer, and have enough food stored up over winter to go into the seedmaking business early the following year.

Within the limitations imposed by circumstances, these flat mats are very satisfactory. They can stay on the job of making food until the very last possible moment; they elbow all other competing plants out of their circle; they squat low, so that the lightest snowfall protects them against drying out in the severe winter winds. And in the spring they can begin to do business at the old stand the moment the snow melts away.

ASTRONOMY

Moon Is Truly Inconstant

➤ THE MOON lives up astronomically to its reputation of being inconstant. But an electronic "brain" with its terrific speed for handling involved calculations is helping astronomers keep exact track of the moon's irregular movements.

Thanks to an electronic calculating machine, future positions of the moon among the stars are being figured with greater accuracy than has ever before been possible, Dr. W. J. Eckert of the Watson Scientific Computing Laboratory of the International Business Machines Corporations and Dr. Edgar W. Woolard of the U. S. Naval Observatory reported to members of the American Astronomical Society meeting in Cleveland.

Today the moon furnishes the most accurate methods of measuring large distances, such as those across major oceans. The exact position of the moon is needed more and more in astronomy and surveying.

Up to this time, in calculating the position of the moon, astronomers have used tables constructed from formulae developed several decades ago by the late Dr. E. W. Brown of Yale University. Dr. Brown's original formulae which represents the moon's longitude, latitude and distance from the earth contain over 1650 terms. The lunar tables were worked out 30 years ago by Dr. Brown and the late H. B. Hedrick, then at Yale.

Exact values for the theoretical coordinates were computed from the theoretical equations by Dr. Eckert, Miss Rebecca B. Jones and H. K. Clark, using I.B.M.'s Selective Sequence Electronic Calculator.

When Dr. Woolard examined in detail one set of positions calculated with the electronic brain, and compared these with figures computed with the lunar tables at the Nautical Almanac Office, he discovered significant differences. Study indicated that certain simplifications introduced in constructing the original tables did result in slight inaccuracies. Also through some oversight in constructing the tables, certain figures had been used once too often.

MEDICINE

Male Hormone For Starch

➤ DISCOVERED: The male hormone puts starch into the muscles of teen-age boys.

This muscle starching effect of the male hormone, testosterone, was discovered in experiments on rats, reported by Dr. Samuel L. Leonard of Cornell University, Ithaca, N. Y., to the American Association for the Advancement of Science. The starch is glycogen and is formed in the liver from the sugars and starches eaten in food.

The sudden spurt of growth boys make when they reach their teens apparently comes in part because the male hormone is putting starch into their muscles. This increases the size of the young male's body. The increase is in addition to that which comes through the action of another hormone, the growth hormone from the pituitary gland in the head.

Testosterone, the male hormone, has previously been found to have another growth-promoting effect. This comes because it influences the body to retain more nitrogen to build new body tissue.

In the experiments Dr. Leonard reported, he castrated male rats to deprive them of their own male hormone. During the first seven days after this the glycogen, or starch, in certain of the muscles decreased 15% to 32%. From 15 to 96 days after castration, however, the glycogen in the muscles was the same as that of non-castrated rats.

But, Dr. Leonard reported, when male hormone was injected into castrated male rats, regardless of how long they had been without their own hormone supply, the glycogen, or starch, in their muscles increased "dramatically," even to the extent of 100% above that of non-castrated animals. The hormone acts quickly, causing this effect within 24 hours after injection.

Starch, or glycogen, in the muscles of normal male rats can be increased even more by injections of male hormone for three days.

The muscle starching effect of the male hormone is independent of the action of the growth hormone from the pituitary gland. Dr. Leonard found this when he injected male hormone into rats deprived of both pituitary and sex glands.

Science News Letter, January 12, 1952

● RADIO

Saturday, Jan. 19, 1952, 3:15-3:30 p.m. EST

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Edward R. Sharp, director, Lewis Flight Propulsion Laboratory, National Advisory Committee for Aeronautics, discusses "Airplane Development."

MEDICINE

Confusion Over "Shock"

➤ "SHOCK" DOES not mean the same to everyone, not even doctors. Two British physicians, Drs. R. T. Grant and E. B. Reeve, criticize the common and loose employment of the word shock to describe the condition of disaster casualties. This may even cost human life.

The so-called condition of shock, they say, is "ill-defined." There is no assurance "that cases grouped by one man as shock or no shock or in a particular degree of shock will correspond at all closely in underlying causative factors, or even in symptoms or signs, with those so grouped by another."

As commonly used, shock may at one time apply to a person who is suffering from great loss of blood and at another to one who is suffering from pain, fright, cold or infection. The result may be a disastrous delay in starting proper treatment.

Based on a study made by teams of British doctors on over 300 severely injured people, most of them air raid and war casualties, the report concludes that in most cases of abdominal injury or of severe injury of the limbs the chief, and often unrecognized, condition requiring urgent treatment is a drastic loss of blood. The high death rate among patients with very large limb injuries was mainly due "to failure to recognize the grossness of the hemorrhage and to give sufficient blood by vein sufficiently early and quickly.

"In such cases the hemorrhage is of the order of 50% or more of the total blood; these patients urgently require very large transfusions and respond well to them."

Any patient with a very large wound usually requires a very large transfusion, "much more than even a bold transfusion officer is inclined to give till he has learned for himself."

In their experience the doctors found that it was "bad practice to delay transfusion." If life is to be saved, then transfusion must begin at once in any casualty showing "a marked degree of circulatory failure." Signs of these are: blood pressure below 70, rapid heart rate, marked pallor, cold extremities, and often restlessness and difficult breathing.

On the basis of their very careful and extensive observations the doctors have been able to reclassify the post-injury conditions formerly loosely lumped together under the term shock and arrange them in a series of recognizable patterns which make diagnosis more precise and guide treatment better than using the prevailing idea of shock.

Working from the normal circulatory pattern of "normal blood pressure, a normal pulse rate, warm extremities and a good face color," the doctors have defined a half dozen disturbed variations of this normal pattern, giving each a characteristic name and describing the type and degree of injury with which each is usually associated.

The report is called "Observations on the General Effects of Injury in Man."

Science News Letter, January 12, 1952

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ENGINEERING

More Enter Engineering Schools Than Expected

➤ THE HUE and cry over the shortage of engineers for defense may have paid off. About 39,500 students enrolled as freshmen in 192 engineering colleges this past fall, it has been learned.

This is 15% above the 1950 enrollment, while all college enrollments dropped 9%. It contrasts with 34,000 new freshmen expected. The figures were reported by Dr. H. H. Armsby of the Office of Education to the American Association for the Advancement of Science meeting in Philadelphia.

Estimates of June graduates were low too, Dr. Armsby said. The experts guessed that 38,000 engineers were graduated last June. Final figures show, he said, that actually 42,000 graduated.

Dr. Armsby pointed out that this does not by any means solve the problem of the shortage of engineers, estimated to be in the neighborhood of 60,000, "but it helps."

Science News Letter, January 12, 1952

GENETICS

More Boys Born to Some Blood Groups

➤ THE FIRST hereditary link with the boy-girl ratio in human births has been found in observations made in Bombay and New York by Dr. L. D. Sanghvi, now connected with Columbia University.

When mother and child are both of the same type O blood group, the percentage of boys born is 60.5 instead of the overall sex ratio of 54.6. When the mother and child are both A blood group the sexes are about evenly divided, with the ratio 49.8. B group infants born to B mothers had a sex ratio of 57.7. These figures were developed in Bombay from tests on 1,330 mothers and babies.

New York tests confirmed the difference in sex ratio, the O groups giving a sex-ratio of 56.3 and the A groups 45.7, he reports to the British journal NATURE (Dec. 22).

Science News Letter, January 12, 1952

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• Books of the Week •

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THE BATTLE FOR MENTAL HEALTH—James Clark Moloney—*Philosophical Library*, 105 p., $3.50. The author expresses the belief that American mental health could be improved by a more relaxed attitude of mothers toward their children.

CHEMISTRY IN ACTION—George M. Rawlins and Alden H. Struble—*Heath*, 2d ed., 575 p., illus., $3.60. A short high school text. Abundantly illustrated.

CONTRIBUTIONS TO THE FLORA OF SOUTH AMERICA: Studies on Andean Compositae II, Studies in South American Plants III—Jose Cuatrecasas—*Chicago Natural History Museum*, 113 p., illus., paper, $1.50.

EROSION STUDIES ON THE SCHOHARIE WATERSHED, NEW YORK—Irvin C. Reigner—*Northeastern Forest Experiment Station*, 17 p., illus., paper, free upon request to publisher, 102 Motors Ave., Upper Darby, Pa. Results of a study to find the cause of New York's water shortage in 1949-50. It cannot be blamed on excessive erosion or sedimentation. Some sort of land-use program is needed, however, to regulate the flow of water into the reservoir.

EXPLORING ATOMIC ENERGY—John Lewellen—*Science Research Associates*, 40 p., illus., paper, 40 cents. Boys and girls are introduced to the bomb and its control, peacetime uses of atomic energy, and some of the basic facts behind atomic fission.

THE GRASSLAND LIVESTOCK HANDBOOK—*Joint Committee on Grassland Farming*, 48 p., illus., paper, 25 cents. Showing farmers how to take advantage of this economical form of animal nutrition.

HANDBOOK OF BASIC MICROTECHNIQUE—Peter Gray—*Blakiston*, 141 p., illus., $3.00. Telling the student how to prepare animal or plant material for study under the microscope.

INFLUENCE OF ALCOHOLS UPON THE UNCATALYZED REACTION BETWEEN RESORCINOL AND FORMALDEHYDE—R. A. V. Raff and B. H. Silverman—*Mellon Institute*, 7 p., paper, free upon request to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. Reprinted from the Canadian Journal of Chemistry.

MAKING A LIVING IN THE MARBIAL VALLEY (Haiti)—Alfred Metraux with E. Berrouet and Dr. and Mrs. Jean Comhaire-Sylvain—*UNESCO*, 217 p., illus., paper, free upon request to Education Clearing House, UNESCO, 19, Avenue Kleber, Paris XVI. Results of an anthropological survey preparatory to UNESCO's fundamental education pilot project. Marbial is an area which has seen better days, the decay being due to erosion, small holdings and over-population.

MODERN ELECTROCARDIOGRAPHY: Volume I, the P-Q-R-S-T-U Complex—Eugene Lepeschkin—*Williams and Wilkins*, 598 p., illus., $12.00. Of use to the greatly increased number of physicians with electrocardiographic equipment and little if any knowledge of its proper use.

PRINCIPLES OF QUANTUM MECHANICS: Nonrelativistic Wave Mechanics with Illustrative Applications—William V. Houston—*McGraw-Hill*, 288 p., $6.00. To provide the student with a formulation of quantum mechanics such that he can make applications for himself and can understand published work.

PROCEEDINGS OF THE FIRST CONFERENCE ON CANCER DIAGNOSTIC TESTS—National Advisory Cancer Council—*Govt. Printing Office*, Public Health Service Publication No. 96, 91 p., paper, 30 cents. Providing authoritative information on a controversial subject.

RANGE-FINDING TOXICITY DATA: List IV—Henry F. Smyth, Jr., Charles P. Carpenter, and Carrol S. Weil—*Mellon Institute*, 4 p., paper, free upon request to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. Data for evaluation of the hazard in handling certain materials in industry.

RELATIONSHIPS OF CERTAIN GENERA OF FUNGUS GNATS OF THE FAMILY MYCETOPHILIDAE—F. R. Shaw and M. M. Shaw—*Smithsonian*, 22 p., illus., paper, 20 cents. A continuation of a preliminary investigation of the possible value of thoracic sclerites in determining the relationships of certain insects.

SOME PHYSICAL AND MECHANICAL PROPERTIES OF AMERICAN BEECH—Benson H. Paul and John T. Drow—*Northeastern Forest Experiment station*, 17 p., illus., paper, free upon request to publisher, 102 Motors Avenue, Upper Darby, Pa. Information gathered with a view to putting beech to the uses it deserves.

SYMPOSIUM ON LOCAL DIVERSITY IN IROQUOIS CULTURE—William N. Fenton, Ed.—*Govt. Printing Office*, Bureau of American Ethnology, Bulletin 149, 187 p., illus., paper, 75 cents. The papers, by a number of authors, are based on field work in the present communities.

TOTEM AND TABOO: Some Points of Agreement Between the Mental Lives of Savages and Neurotics—Sigmund Freud, translation by James Strachey—*Norton*, 172 p., $3.00. A new translation of a Freudian classic.

TOXICOLOGY OF TWO BUTOXYPOLYPROPYLENE GLYCOL FLY REPELLENTS—Charles P. Carpenter, Frances H. Critchfield, John H. Nair and C. Boyd Shaffer—*Mellon Institute*, 9 p., paper, free upon request to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. Information for those handling and applying formulations of the compounds.

THE WORKS OF MAN—Lisle March Phillipps—*Philosophical Library*, rev. ed., 330 p., illus., $4.75. A British art critic writes this "bird's eye view" of the great creative epochs of art not from the aesthetic standpoint but as an expression of human life and character.

Science News Letter, January 12, 1952

The fringes on the so-called fringe-footed sand *lizard* of southwestern deserts aid the animal in running in loose sand.

Penguins, *birds* of the Antarctic, have folds of skin between the legs in which the egg is carried until hatched; if left on the ice the eggs would freeze and never hatch.

NEW BOOM TOWNS IN AMERICA

Your Income Depends Upon Where You Live says Author

CLEARWATER, FLORIDA. The amount of money you earn at your job or from your business does not depend entirely upon your ability or even upon the kind of job or enterprise you're in, says Norman D. Ford, founder and first president of the famous Globe Trotters Club. It also depends upon where you live.

The biggest opportunities are in the boom areas, he says, where industry is growing and there's a big demand for new workers and for new, small businesses.

You might be earning 50% more today, says Ford, if you had known some years ago which towns, like Houston or Los Angeles, were beginning to boom then. A recent U. S. Government report shows that the net income of individuals went up 50% more in the past 20 years in the boom regions of the U. S. than elsewhere in the country.

Today, says Ford, who has just completed a survey of the United States to learn which are the boom towns of the 1950's, there are about a hundred communities all over America which are beginning to show the signs of a coming boom. These are certain towns and cities along the Atlantic Seaboard, in Georgia, Florida, the North Carolina highlands, in Mississippi, Alabama, Louisiana, Oklahoma, Texas, Colorado, the Far West, California, the Pacific Northwest, Alaska, etc.

These are the towns where it's easier to get a good job, with good pay, and with the best chances in the country for swift promotion, whether you're 20 or 50. These are also the towns where you can start a small business and grow fast as the boom pours in more purchasing power to boost your sales and bring more profits.

Here too are the communities where you can open tourist cabins on brand new highways to the most popular tourist regions in America. Here are places where you can earn most from rental income (stores, apartments, etc.).

And if the experience of real estate in Houston, Los Angeles, and other boom towns of the past is any guide, says Ford, these too are the towns and cities where you can invest in low cost real estate today for unusual profits in the years to come.

In his new book, **Where to Make More Money**, Norman D. Ford names the new boom towns. He tells what are the best job and small business opportunities here.

This book will help you:

- **if you are about to leave school, college, or the Armed Forces**
- **if you wish to start your own small business, farm, motel, etc.**
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One of the best features of "Where to Retire on a Small Income" is that every town, city, or region described was selected because it offers opportunities to get part-time or seasonal jobs or to open a part-time business.

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—where your hobby will bring you an income;
—where you stand the best chance of living longer.

You'd spend months, plus hundreds of dollars if you searched for the hundreds of facts in this book by traveling around the country. But all these facts on little known beauty spots, America's favorite retirement areas, and many undiscovered towns, cities, and regions, are yours for just $1.

Sooner or later—now or in years to come—you will want to be independent. Order today, while you think of it. Money back, of course, if you're not satisfied.

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How to Gain Financial Independence

through a home in the country

Read this story of a city man who gained financial independence in 3 years of weekend fun in the country

Some hard work with hammer, nails, paint brush, and the other tools men like to wield on their days off from the job, converted a neglected country home—bought at a bargain price by a city civil service worker—into a 2-acre country estate, worth 4 times more. Total time: about a hundred weekends over a 3 year period. Outside help: some assistance from his two teenage sons and a few major repairs by local contractors.

Now he lives in the country all year round and spends an hour commuting to his city job. Working weekends in the summer on his bit of land, he cuts his living costs, and he also sells enough surplus strawberries, apples, pears, and peaches to earn over a thousand more a year. With his extra income, the lower living costs of the country, and the security of his country home, he has financial independence.

The stories of thousands of other men who won security in the country inspired Fred Tyler to write his new book on how you can own your home in the country and make it pay for itself.

Fred Tyler proves over and over again that whether you want to commute to a city job or be your own boss in the country, you can live better, enjoy yourself more, earn more, and bring a good, clean life to you and your family.

His new book tells you how to buy a country home almost on a shoestring and make it worth 2, 3, even 4 times what it cost you. He shows how you, like thousands of others, can turn your surplus land into a profitable spare time or weekend business. He proves again and again that whether you farm, open a shop, an office, or sell a service, you can make a mighty comfortable living in the country . . . doing the things you always wanted to do . . . and gaining the security so few people in the city ever find.

Honestly—ask yourself: Are you living the kind of life you'd like to? Are you frittering away your weekends? Or are you doing the simple things necessary to win security for you and your family?

Send today for Fred Tyler's Plan for Independence. 15 fact-filled chapters for only $1. To get your copy, fill out coupon below.

RETIREMENT—HOW MUCH INCOME DO YOU NEED?

—from "The Mutual Investor"

Many a person has planned to retire in recent years, only to find that his income wasn't enough to support him when the time came, due to increases in cost of living.

But here's a silver lining: some recent studies have shown, in dollars and cents, how much less an individual or a family needs when retired than when the breadwinner is still going to work. It's really surprising.

For example, Norman D. Ford, in a book entitled "Retire Young and Start Living," takes a family of four people living in the city on a moderate income. He then shows, in figures, that the same family, living on a retirement estate, could get along with about the same comforts (although with more work at home) on about half that amount.

Norman Ford's "Retire Young and Start Living" is one of the three booklets in his 3-unit retirement kit. The other two are "How to Earn an Income While Retired" and "Lands in the Sun"; where to spend a while, even retire, in Mexico, the West Indies, and other lands to the south where the dollar buys so much more." $1 for all 3. Use coupon below to order.

WHERE DO YOU WANT TO GO?

France? Brazil? West Indies? Hawaii? Canada?

Read what the Christian Science Monitor says about a new way to travel that sometimes costs 1/3 to 1/2 less.

By the travel editor of The Christian Science Monitor: Many fascinating travel booklets pass over this desk in the course of a year but the one that arrived the other day so interested this department that it cost the office several hours of work in order that we might absorb its content. The booklet is entitled, "Travel Routes Around the World" and is the traveler's directory to passenger-carrying freighters and liners. In no time at all you find yourself far out to sea cruising along under tropical skies without a care in the world. You find yourself docking at strange ports and taking land tours to those places you long have read about. Most interesting of the vast listings of ships are the freighters which carry a limited number of passengers in quarters comparable to the luxury offered in the so-called big cruise ships which devote most of their space for passengers.

The booklet first of all answers the question: What is a freighter? The modern freighter, says the booklet, ranks with the de luxe passenger vessels so far as comforts and accommodations are concerned.

LARGE ROOMS WITH BEDS

It is important to realize that in most cases today, freighter passengers are considered first-class passengers, although the rates charged are generally on a par with either cabin or tourist class fares. Most cabin-carrying freighters, to quote the booklet, have their private bath and shower, and these cabins offer beds, not bunks. The rooms are generally larger than equivalent accommodations aboard passenger ships, and the cabin of a modern freighter is sometimes even twice as large as first-class cabins on some of the older passenger ships. It goes without saying that your room is on the outside, and amidships, the most expensive of all locations, for which you are usually charged a premium over the advertised minimum fares on passenger ships.

This booklet points out that it is frequently astonishing how low freighter fares are as compared with passenger ship fares; for example, less than one-half of the passenger ship fare to California is the amount asked on freighters. On most of the longer runs, the difference in favor of the freighters is regularly from a third to half of the passenger ship fare.

SERVICE AND MEALS RATED EXCELLENT

Service and meals on a freighter leave little to be desired. You will be treated with consideration. Stewards will go out of their way to make your voyage pleasant. On ships with East Indian stewards you will be waited on almost hand and foot, in a manner that is completely unknown to Americans and most Europeans.

Foreign ships offer their own specialties, says the booklet. Thus vessels in the East Indian trade serve Rijkstafel (or King's Table), the East Indian dish which can run to as many as 50 different courses. Scandinavian ships serve smorgasbord every day, and some of their desserts (like strawberries smothered in a huge bowl of whipped cream) are never forgotten. Another feature of freighter travel is in its informality. No formal clothes are needed. Sport clothes are enough.

Other valuable information such as how to tip, shipboard activities, and costs are covered in the booklet, "Travel Routes Around the World."

Some of the trips listed include a trip to England for $160, a 12-day Carribbean cruise for $240, or a leisurely three-month Mediterranean voyage for $500.

The booklet is published by Harian Publications, Greenlawn, New York, and may be obtained by sending to the publisher.

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PAPER UMBRELLAS, resistant to water because coated with waterproof resin, are closely folded in stiff pleats that open up and close down like an ordinary umbrella but eliminate the need for metal ribs. This economical and easily replaced umbrella comes in various colors.

Science News Letter, January 12, 1952

FLASH GUARD, for use in taking photographs with flashlights, is a plastic bag-like affair to put over the bulb which gives safety from shattering. It has clear transparent material on one side, and a blue plastic on the other which acts as a filter for color shots.

Science News Letter, January 12, 1952

HASSOCKS FOR leg rests or temporary seats come in pairs, one fitting within the other to save space when not in use. Both are bucketlike affairs, with lift-off lids and finished in a plastic that looks and feels like fine fabric.

Science News Letter, January 12, 1952

LIGHTER KIT, for the smoker, contains in a gift package a cigarette lighter, a packet of six flints and a can of lighter fluid. The lighter supplied is the one chosen by the customer and is placed in the package by the local dealer when a sale is made.

Science News Letter, January 12, 1952

FOOT-WARMER, for the office worker or the traffic officer, is a movable rubber mat, shown in the photograph, heated electrically from any convenient electric outlet. The material used is a conductive rubber long used as deicing installation on airplane propellers and leading edges of wings.

Science News Letter, January 12, 1952

LIFE RAFT, an inflatable rubber affair in a torpedo-size aluminum alloy container, can be dropped from an airplane or launched from a vessel, expanding automatically when it hits the water. It is equipped with an engine and steering mechanism which can be controlled by radio from the mother ship.

Science News Letter, January 12, 1952

SCARE-BIRD to eliminate the roosting of nuisance birds on city buildings is a mechanical device in the shape of a bird that flaps its wings and turns its head. Operated electrically, this recently patented device is constructed to resemble an enemy bird of the nuisance birds.

Science News Letter, January 12, 1952

HEATED BED, granted a recent patent, is a four-poster with roof, within which is an electric heater, and side curtains of a material designed to reflect radiant heat. An electric blower provides ventilation and a thermostat automatically controls temperature.

Science News Letter, January 12, 1952

Do You Know?

If *oranges* are squeezed too hard in extracting the juice for a beverage, oil from the peel gets into the liquid.

The pressure used in making a *snowball* melts the flakes enough to cause them to stick together.

The need of *vitamin C* to prevent scurvy has been long known but it is also necessary for the utilization of certain amino acetic acids from food.

Fingerling *trout*, distributed from hatcheries to streams, require about a year to grow to a six-inch size.

Drag *parachutes* are standard equipment for certain jet-propelled bombers.

Tobacco was originally a tropical product but it is now being grown from Canada to Argentina.

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